

## SEQUENCE LISTING

<110> Piddington, Christopher S.
 Petrie, Charles
 Shoemaker, Kimberly E.
 Bishop, Paul D.

<120> ZACE2: A HUMAN METALLOENZYME

<130> 99-24C1

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<150> 60/151,181 <151> 1999-08-27

<150> 09/563,516 <151> 2000-05-03

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103

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	_				_	-		_	_	_	_		_	caa Gln		343
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tct Ser 280	ttg Leu	aca Thr	gtt Val	ccc Pro	ttt Phe 285	gga Gly	cag Gln	aaa Lys	cca Pro	aac Asn 290	ata Ile	gat Asp	gtt Val	act Thr	gat Asp 295	919
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		Pro					Leu					Phe			ctt Leu	1111
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715 720 725	
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745 750 755	
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760 765 770 775	
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780 785 790	
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795 800 805	
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20 25 30  Asn His Glu Ala Glu Asp Leu Phe Tyr Gln Ser Ser Leu Ala Se 35 40 45  Asn Tyr Asn Thr Asn Ile Thr Glu Glu Asn Val Gln Asn Met As	r Trp n Asn u Ala 80 u Gln
35 40 45 Asn Tyr Asn Thr Asn Ile Thr Glu Glu Asn Val Gln Asn Met As	n Asn u Ala 80 u Gln
Asn Tyr Asn Thr Asn Ile Thr Glu Glu Asn Val Gln Asn Met As	u Ala 80 u Gln
50 55 60	80 u Gln
Ala Gly Asp Lys Trp Ser Ala Phe Leu Lys Glu Gln Ser Thr Le 65 70 75	
Gln Met Tyr Pro Leu Gln Glu Ile Gln Asn Leu Thr Val Lys Le 85 90 95	
Leu Gln Ala Leu Gln Gln Asn Gly Ser Ser Val Leu Ser Glu As 100 105 110	p Lys
Ser Lys Arg Leu Asn Thr Ile Leu Asn Thr Met Ser Thr Ile Ty 115 120 125	r Ser
Thr Gly Lys Val Cys Asn Pro Asp Asn Pro Gln Glu Cys Leu Le 130 135 140	u Leu
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Arg Leu Trp Ala Trp Glu Ser Trp Arg Ser Glu Val Gly Lys Gl 165 170 17	n Leu '5
Arg Pro Leu Tyr Glu Glu Tyr Val Val Leu Lys Asn Glu Met Al 180 185 190	a Arg
Ala Asn His Tyr Glu Asp Tyr Gly Asp Tyr Trp Arg Gly Asp Ty 195 200 205	r Glu
Val Asn Gly Val Asp Gly Tyr Asp Tyr Ser Arg Gly Gln Leu I <sup>-</sup> 210 215 220	e Glu
Asp Val Glu His Thr Phe Glu Glu Ile Lys Pro Leu Tyr Glu H <sup>-</sup> 225 230 235	is Leu 240
His Ala Tyr Val Arg Ala Lys Leu Met Asn Ala Tyr Pro Ser Ty	yr Ile 55
Ser Pro Ile Gly Cys Leu Pro Ala His Leu Leu Gly Asp Met To 260 265 270	rp Gly
Arg Phe Trp Thr Asn Leu Tyr Ser Leu Thr Val Pro Phe Gly G 275 280 285	In Lys

Pro Asn Ile Asp Val Thr Asp Ala Met Val Asp Gln Ala Trp Asp Ala Gln Arg Ile Phe Lys Glu Ala Glu Lys Phe Phe Val Ser Val Gly Leu Pro Asn Met Thr Gln Gly Phe Trp Glu Asn Ser Met Leu Thr Asp Pro Gly Asn Val Gln Lys Ala Val Cys His Pro Thr Ala Trp Asp Leu Gly Lys Gly Asp Phe Arg Ile Leu Met Cys Thr Lys Val Thr Met Asp Asp Phe Leu Thr Ala His His Glu Met Gly His Ile Gln Tyr Asp Met Ala Tyr Ala Ala Gln Pro Phe Leu Leu Arg Asn Gly Ala Asn Glu Gly Phe His Glu Ala Val Gly Glu Ile Met Ser Leu Ser Ala Ala Thr Pro Lys His Leu Lys Ser Ile Gly Leu Leu Ser Pro Asp Phe Gln Glu Asp Asn Glu Thr Glu Ile Asn Phe Leu Leu Lys Gln Ala Leu Thr Ile Val Gly Thr Leu Pro Phe Thr Tyr Met Leu Glu Lys Trp Arg Trp Met Val Phe Lys Gly Glu Ile Pro Lys Asp Gln Trp Met Lys Lys Trp Trp Glu Met Lys Arg Glu Ile Val Gly Val Val Glu Pro Val Pro His Asp Glu Thr Tyr Cys Asp Pro Ala Ser Leu Phe His Val Ser Asn Asp Tyr Ser Phe Ile Arg Tyr Tyr Thr Arg Thr Leu Tyr Gln Phe Gln Phe Gln Glu Ala Leu Cys Gln Ala Ala Lys His Glu Gly Pro Leu His Lys Cys Asp Ile Ser Asn Ser Thr Glu Ala Gly Gln Lys Leu Phe Asn Met Leu Arg Leu Gly Lys Ser Glu Pro Trp Thr Leu Ala Leu Glu Asn Val Val Gly Ala Lys Asn Met Asn Val Arg Pro Leu Leu Asn Tyr Phe Glu Pro Leu Phe Thr Trp Leu Lys Asp Gln Asn Lys Asn Ser Phe Val Gly Trp Ser Thr Asp Trp Ser Pro Tyr Ala Asp Gln Ser Ile Lys Val Arg Ile Ser Leu 

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Lys	Val	Lys	Asn 660	Gln	Met	Ile	Leu	Phe 665	Gly	Glu	Glu	Asp	Val 670	Arg	Val
Ala	Asn	Leu 675	Lys	Pro	Arg	Ile	Ser 680	Phe	Asn	Phe	Phe	Va1 685	Thr	Ala	Pro
Lys	Asn 690	Val	Ser	Asp	Ile	Ile 695	Pro	Arg	Thr	Glu	Va1 700	Glu	Lys	Ala	Ile
Arg 705		Ser	Arg	Ser	Arg 710	Ile	Asn	Asp	Ala	Phe 715	Arg	Leu	Asn	Asp	Asn 720
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Pro	Pro	Val	Ser 740	Ile	Trp	Leu	Ile	Val 745	Phe	Gly	Val	Val	Met 750	Gly	Val
Ile	Val	Val 755	Gly	Пе	Val	Ile	Leu 760	Ile	Phe	Thr	Gly	I1e 765	Arg	Asp	Arg
Lys	Lys 770	Lys	Asn	Lys	Ala	Arg 775	Ser	Gly	Glu	Asn	Pro 780	Tyr	Ala	Ser	Ile
Asp 785		Ser	Lys	Gly	G1u 790	Asn	Asn	Pro	Gly	Phe 795	G1n	Asn	Thr	Asp	Asp 800
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tcc Ser 5	tgg Trp	ctc Leu	ctt Leu	ctc Leu	agc Ser 10	ctt Leu	gtt Val	gct Ala	gtt Val	act Thr 15	act Thr	gct Ala	cag Gln	tcc Ser	ctc Leu 20	165
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gaa Glu	gac Asp	ctg Leu	tct Ser 40	tat Tyr	caa Gln	agt Ser	tca Ser	ctt Leu 45	gct Ala	tct Ser	tgg Trp	aat Asn	tat Tyr 50	aat Asn	act Thr	261
aac Asn	att Ile	act Thr 55	gaa Glu	gaa Glu	aat Asn	gcc Ala	caa Gln 60	aag Lys	atg Met	agt Ser	gag Glu	gct Ala 65	gca Ala	gcc Ala	aaa Lys	309
tgg Trp	tct Ser 70	Ala	ttt Phe	tat Tyr	gaa Glu	gaa Glu 75	cag Gln	tct Ser	aag Lys	act Thr	gcc Ala 80	caa Gln	agt Ser	ttc Phe	tca Ser	357
cta	caa	gaa	atc	cag	act	ccg	atc	atc	aag	cgt	caa	cta	cag	gcc	ctt	405

Leu 85	Gln	Glu	Ile	Gln	Thr 90	Pro	Ile	Ile	Lys	Arg 95	Gln	Leu	Gln	Ala	Leu 100	
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aga Arg	atc Ile	aag Lys	atg Met	. Cys	aca Thr	aag Lys	gtc Val	aca Thr 365	Met	gac Asp	aac Asr	ttc Phe	ttg Leu 370	ınr	gcc Ala	1221
cat His	cac His	Glu	ı Met	gga Gly	His	: Ile	Glr	a tat n Tyr )	· Ast	) Met	gca : Ala	a tat a Tyr 385	` Ala	agg Arg	g caa g Gln	1269
cct Pro	tto Phe 390	. Lei	g cta u Lei	a aga u Arg	aac JAsr	gga n Gly 395	/ A1a	a ast	gaa n Glu	a ggg u Gly	tto Pho 40	e H19	t gaa s Glu	a gct u Ala	t gtt a Val	1317
gga Gly 405	Glu	a ato u Ilo	c atg e Me	g toa t Ser	a cti Lei 410	u Sei	t gc	a gc	t ace a Th	c ccc r Pro 41	o Ly	g car s Hi:	t ctg s Lei	g aaa u Ly:	a tcc s Ser 420	1365
att Ile	gg Gl	t ct y Le	t ct u Le	g cca u Pro 42!	o Se	c gar r Asi	t tt p Ph	t ca e G1	a ga n G1 43	u As	t ag p Se	c ga r Gl	a ac u Th	a ga r Gl 43	g ata u Ile 5	1413

aac Asn	ttc Phe	cta Leu	ctg Leu 440	aaa Lys	cag Gln	gca Ala	ttg Leu	aca Thr 445	att Ile	gtt Val	gga Gly	aca Thr	cta Leu 450	ccg Pro	ttt Phe	1461
act Thr	tac Tyr	atg Met 455	tta Leu	gag Glu	aag Lys	Trp	agg Arg 460	tgg Trp	atg Met	gtc Val	ttt Phe	cgg Arg 465	ggt Gly	gaa Glu	att Ile	1509
ccc Pro	aaa Lys 470	gag Glu	cag Gln	tgg Trp	atg Met	aaa Lys 475	aag Lys	tgg Trp	tgg Trp	gag Glu	atg Met 480	aag Lys	cgg Arg	gag Glu	atc Ile	1557
gtt Val 485	ggt Gly	gtg Val	gtg Val	gag Glu	cct Pro 490	ctg Leu	cct Pro	cat His	gat Asp	gaa Glu 495	aca Thr	tac Tyr	tgt Cys	gac Asp	cct Pro 500	1605
gca Ala	tct Ser	ctg Leu	ttc Phe	cat His 505	gtt Val	tct Ser	aat Aşn	gat Asp	tac Tyr 510	tca Ser	ttc Phe	att Ile	cga Arg	tat Tyr 515	Tyr	1653
aca Thr	agg Arg	acc Thr	att Ile 520	Tyr	caa Gln	ttc Phe	cag Gln	ttt Phe 525	Gln	gaa Glu	gct Ala	ctt Leu	tgt Cys 530	Gin	gca Ala	1701
gct Ala	aag Lys	tat Tyr 535	Asn	ggt Gly	tct Ser	ctg Leu	cac His 540	Lys	tgt Cys	gac Asp	atc Ile	tca Ser 545	· Asr	tcc Ser	act Thr	1749
gaa Glu	gct Ala 550	a Gly	g cag / Glr	aag Lys	ttg Leu	ctc Leu 555	Lys	atg Met	ctg Lei	agt Ser	ctt Leu 560	Gly	a aat ⁄ Asr	tca Ser	gag Glu	1797
ccc Pro 565	) Trp	g aco Thi	c aaa c Lys	a gco s Ala	ttg Leu 570	ı Glu	aat Asr	gtg n Val	gta Val	gga Gly 575	/ Ala	a agg	g aat g Asr	t atq n Mei	g gat E Asp 580	1845
gta Va	a aaa I Ly:	a cc s Pr	a cto o Leo	g cto u Leo 589	ı Asr	tac n Tyr	tto Phe	c caa e G1r	cco Pro 590	) Lei	g tti u Phe	t gad e As	c tgg p Trj	g cto p Leo 59!	g aaa u Lys 5	1893
ga	g ca	g aa	c ag	a aa	t tct	t tti	t gt	g ggg	g tg	g aad	c ac	t ga	a tg	g ag	c cca	1941

Glu	Gln	Asn	Arg 600	Asn	Ser	Phe	Val	Gly 605	Trp	Asn	Thr	Glu	Trp 610	Ser	Pro	
tat Tyr	gcc Ala	gac Asp 615	caa Gln	agc Ser	att Ile	aaa Lys	gtg Val 620	agg Arg	ata Ile	agc Ser	cta Leu	aaa Lys 625	tca Ser	gct Ala	ctt Leu	1989
gga Gly	gct Ala 630	aat Asn	gca Ala	tat Tyr	gaa Glu	tgg Trp 635	acc Thr	aac Asn	aac Asn	gaa Glu	atg Met 640	ttc Phe	ctg Leu	ttc Phe	cga Arg	2037
tca Ser 649	tct Ser	gtt Val	gca Ala	tat Tyr	gcc Ala 650	atg Met	aga Arg	aag Lys	tat Tyr	ttt Phe 655	tca Ser	ata Ile	atc Ile	aaa Lys	aac Asn 660	2085
caq Glr	g aca n Thr	gtt Val	cct Pro	ttt Phe 665	cta Leu	gag Glu	gaa Glu	gat Asp	gta Val 670	cga Arg	gtg Val	agc Ser	gat Asp	ttg Leu 675	aaa Lys	2133
cc: Pro	a aga o Arg	gtc Val	tcc Ser 680	ttc Phe	tac Tyr	ttc Phe	ttt Phe	gtc Val 685	acc Thr	tca Ser	ccc Pro	caa Gln	aat Asn 690	gtg Val	tct Ser	2181
ga As	t gtc o Val	att Ile 695	Pro	aga Arg	agt Ser	gaa Glu	gtt Val 700	Glu	gat Asp	gcc Ala	atc Ile	agg Arg 705	Met	tct Ser	cgg Arg	2229
gg G1,	c cgc y Arg 710	Ile	aat Asn	gat Asp	gtc Val	ttt Phe 715	Gly	ctg Leu	aat Asn	gat Asp	aac Asn 720	Ser	ctg Leu	gag Glu	ttt <sub>.</sub> Phe	2277
ct Le 72	g ggg u Gly 5	att Ile	cac His	cca Pro	aca Thr 730	Leu	gag Glu	cca Pro	cct Pro	tac Tyr 735	Gln	cct Pro	. cct Pro	gtc Val	acc Thr 740	2325
at	a tgg	ctg	att	att	ttt	ggt	gtt	gtg	atg	gca	ctg	gta	gtg	gtt	. ggc	2373
IJ	e Trp	Leu	ı Ile	11e 745		Gly	Val	Val	Met 750		ı Lei	ı Val	Val	Val 755	Gly	
at	c atc	ato	ctg	att	gto	act	. ggg	, atc	aaa	ggt	. cga	a aag	g aag	j aaa	aat	2421

Ile Ile Ile Leu Ile Val Thr Gly Ile Lys Gly Arg Lys Lys Asn 760 765 770	
gaa aca aaa aga gaa gag aac cct tat gac tcg atg gac att gga aaa Glu Thr Lys Arg Glu Glu Asn Pro Tyr Asp Ser Met Asp Ile Gly Lys 775 780 785	2469
gga gaa agc aat gca gga ttc caa aac agt gat gat gct cag act tcc Gly Glu Ser Asn Ala Gly Phe Gln Asn Ser Asp Asp Ala Gln Thr Ser 790 795 800	2517
ttt tagcaaagca cttgtcatct tcctgtatgt aaatgctaac ttcatagtac Phe 805	2570
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20 25 30  Asn Gln Glu Ala Glu Asp Leu Ser Tyr Gln Ser Ser Leu Ala Ser Trp 35 40 45	
Asn Tyr Asn Thr Asn Ile Thr Glu Glu Asn Ala Gln Lys Met Ser Glu	
Ala Ala Ala Lys Trp Ser Ala Phe Tyr Glu Glu Gln Ser Lys Thr Ala	
65 70 75 80  Gln Ser Phe Ser Leu Gln Glu Ile Gln Thr Pro Ile Ile Lys Arg Gln  85 90 95	
Leu Gln Ala Leu Gln Gln Ser Gly Ser Ser Ala Leu Ser Ala Asp Lys  100 105 110	
Asn Lys Gln Leu Asn Thr Ile Leu Asn Thr Met Ser Thr Ile Tyr Ser	

Thr G	lv I	VS	Val	Cvs	Asn	Pro	Lvs	Asn	Pro	Gln	Glu	Cys	Leu	Leu	Leu
1	30					135					140				
Glu P	ro (	Gly	Leu	Asp		Пе	Met	Ala	Thr	Ser	Thr	Asp	Tyr .	Asn	Ser 160
145		_	. 7	T	150	C1.4	Tnn	۸na	د ۱۸	155	Val	Glv	lvs		
Arg L	.eu	Irp	Ala	1rp 165	GIU	ыу	пр	Arg	170	ulu	vai	uiy	LJ 3	175	
Arg P	ro '	i eu	Tvr	Glu	Glu	Tyr	Val	Val		Lys	Asn	Glu	Met	Ala	Arg
			180					185					190		
Ala A		105					200					205			
Ala (	210					215					220				
Asp \	/al	Glu	Arg	Thr	Phe	Ala	Glu	Ile	Lys	Pro	Leu	Tyr	Glu	His	Leu
225					230					235					240
His /	41 a	Tyr	Val	Arg 245	Arg	Lys	Leu	met	250	1111	ı yı	110	JCI	255	110
Ser l	Pro	Thr	G1 v	Cys	Leu	Pro	Ala	His	Leu	Leu	Gly	Asp	Met	Trp	Gly
			260					265					2/0		
Arg	Phe			Asn	Leu	Tyr	Pro	Leu	Thr	` Val	Pro	285	Ala	GIN	Lys
Dwo	۸cn	275	) . Acr	. Val	Thr	Δsn	280 Ala	Met	: Met	. Asr	Gln			Asp	Ala
	290					295	, )				300				
Glu	Arg	Πe	Phe	e Glr			G]ı	Lys	Phe	e Phe	yal	Ser	Val	Gly	Leu 320
305				01	310	Dha	Tor	\	. Acr	315	) · Mot	ا ا	Thr	Glu	Pro
Pro	His	Met	; Inr	325	i Giy S	PNE	e irp	HIC	331	)	1100	, LCG		335	
Ala	Asp	G1v	/ Arc	1 Lys	s Val	۷a٦	Cys	His	s Pro	o Thi	^ Ala	Trp	Asp	Leu	Gly
			340	)				345	)				350		
His	Gly			e Arg	g Ile	. Lys	s Met 360	t Cys	s in	r Ly:	s vai	365	· Met	. ASL	Asn
Dha	ىرم ا	35!	o r Δ1.	a Hi	s His	: G1:			y Hi	s Il	e Glr			Met	: Ala
	370					37	5				380	)			
Tyr	Ala	Ar	g Gl	n Pr			u Lei	u Ar	g As	n G1	y Ala	a Asr	n Glu	Gly	Phe 400
385	03.		- 1/2	1 (1	390	) . דו	o Mo	+ 50	r le	39 u Se		a Ala	a Thr	r Pro	Lys
HIS	GIU	ı Ai	a va	40		ווג	e ne	t Je	41	0	, ,,,,	J. 7.1.		41	5
His	Leu	ı Ly	s Se	r II	e Gl	y Le	u Le	u Pr	o Se	er As	p Phe	e Gl	n Glu	ı Ası	p Ser
			42	0				42	5				43(	J	
Glu	Thr			e As	n Ph	e Le	u Le 44	u Ly N	S Gl	n Al	a Le	u 111 44.	, 116 5	= va	l Gly
Thr	ei	43 ı Pr	ი Po Ph	ne Th	ır Tv	r Me			u Ly	ıs Tr	p Ar			t Va	1 Phe
1111	450				J	45	55				46	0			

165					470					4/5	Lys				400
Lys				485					490		Pro			495	
			500	Ala				505			Asn		DIO		
		515	Tyr				520				Gln	222			
Leu	Cys 530	Gln	Ala	Ala	Lys	Tyr 535	Asn	Gly	Ser	Leu	His 540	Lys	Cys	Asp	Ile
CAE	Asn	Ser			550	Gly				555	Lys				200
545 Gly	Asn	Ser	Glu	Pro 565	Trp	Thr	Lys	Ala	Leu 570	Glu	Asn	Val	Val	Gly 575	Ala
Arg	Asn	Met	Asp 580	۷a٦	Lys	Pro	Leu	Leu 585	Asn	Tyr	Phe	Gln	Pro 590	Leu	Phe
Asp	Trp	Leu 595	Lys	Glu	Gln	Asn	Arg 600	Asn	Ser	· Phe	e Val	Gly 605	Trp	Asn	Thr
	610	Ser	· Pro			615					620				Leu
625	Ser	· Ala			630	Asn	Ala			63	)				Met 640
Phe	e Lei			645	Ser	Val			650	)				000	
			660	n Glr	1 Thr			665	)				りし	)	y Val
		67	u Lys 5	s Pro			680	)				685	)		r Pro
	69	n Va N	1 Sei			695	5				/0	J			a Ile
Ar 70	g Me	t Se	r Ar	g Gl	y Arq 710		e Asr	n As	p Va	1 Ph 71	e Gl 5	y Lei	u Asi	n As	p Asn 720
Se	r Le			72	u Gly 5	y Il			73	0				/3	
			74	r Il	e Tr			74	5				75	U	a Leu
		75	1 G1	y Il			76	0				/6	5		y Arg
Ly	's Ly 77	rs Ly	's As	n G1	u Th	r Ly 77	s Ar	g G1	u G1	lu As	sn Pr 78	o Ty 80	r As	p Se	r Met
As 78	sp I	le G1	y Ly	rs Gl	у G1 79	u Se	r As	n Al	a G	ly Pl 79	ne G1 95	n As	n Se	r As	sp Asp 800

Ala Gln Thr Ser Phe 805

<210> 7

<211> 2415

<212> DNA

<213> Artificial Sequence

<220>

<223> This degenerate sequence encodes the amino acid sequence of SEQ ID NO:6.

<221> misc feature

<222> (1)...(2415)

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<400> 7

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gcnwsnytnt tycaygtnws naaygaytay wsnttyathm gntaytayac nmgnacnath taycarttyc arttycarga rgcnytntgy cargcngcna artayaaygg nwsnytncay ggnaaywsng thwsnaayws nacngargcn ggncaraary tnytnaarat gytnwsnytn ggnaaywsntyg tnggntggaa yacngartgg wsnccntayg cngaycarws nathaargtn mgnathwsny tnaarwsngc nytnggngcn aaygcntayg artggachaa yacngartgg wsnccntayg artggachaa yaaygaratg tyytnttym gnwsnwsngt ngcntaygcn atgmgnaart ayttywsnat hathaaraay caracngtnc cnttyytnga rgargaygtn mgngtnwsng tyytngart tyytnganat thmgnatgws nmgnggnmgn athaaygayg tnathccnmg nwsngargtn athtggytna thathttygg ngtngtngt genytngtng taygaywsna tggayathgg naarggngar wsnaaygcng gnttycaraa ywsngaygay gncaracnw sntty	1560 1620 1680 1740 1800 1860 1920 1980 2040 2160 2220 2280 2340 2400 2415
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tcc tgg ctc ctt ctc agc ctt gtt gct gtt act act gct cag tcc ctc Ser Trp Leu Leu Ser Leu Val Ala Val Thr Thr Ala Gln Ser Leu 5 10 15 20	165
acc gag gaa aat gcc aag aca ttt tta aac aac ttt aat cag gag gct Thr Glu Glu Asn Ala Lys Thr Phe Leu Asn Asn Phe Asn Gln Glu Ala 25 30 35	213
gaa gac ctg tct tat caa agt tca ctt gct tct tgg aat tat aat act Glu Asp Leu Ser Tyr Gln Ser Ser Leu Ala Ser Trp Asn Tyr Asn Thr 40 45 50	261

aac Asn	att Ile	act Thr 55	gaa Glu	gaa Glu	aat Asn	gcc Ala	caa Gln 60	aag Lys	atg Met	agt Ser	gag Glu	gct Ala 65	gca Ala	gcc Ala	aaa Lys	309
tgg Trp	tct Ser 70	gcc Ala	ttt Phe	tat Tyr	gaa Glu	gaa Glu 75	cag Gln	tct Ser	aag Lys	act Thr	gcc Ala 80	caa Gln	agt Ser	ttc Phe	tca Ser	357
cta Leu 85	caa Gln	gaa Glu	atc Ile	cag Gln	act Thr 90	ccg Pro	atc Ile	atc Ile	aag Lys	cgt Arg 95	caa Gln	cta Leu	cag Gln	gcc Ala	ctt Leu 100	405
cag Glr	caa Gln	agt Ser	ggg Gly	tct Ser 105	tca Ser	gca Ala	ctc Leu	tca Ser	gca Ala 110	gac Asp	aag Lys	aac Asn	aaa Lys	cag Gln 115	ttg Leu	453
aac Asr	aca Thr	att Ile	ctg Leu 120	aac Asn	acc Thr	atg Met	agc Ser	acc Thr 125	att Ile	tac Tyr	agt Ser	act Thr	gga Gly 130	Lys	gtt Val	501
tgo Cy:	aac S Asn	cca Pro 135	Arg	aac Asn	cca Pro	caa Gln	gaa Glu 140	Cys	tta Leu	tta Leu	ctt Leu	gag Glu 145	Pro	gga Gly	ttg Leu	549
ga <sup>.</sup> As	t gaa o Glu 150	ı Ile	atg Met	gcg Ala	aca Thr	agc Ser 155	Thr	gac Asp	tac Tyr	aac Asr	tct Ser 160	· Arg	cto Leu	tgg Trp	gca Ala	597
tg Tr 16	p Glı	ı Gly	/ Trp	agg Arg	Ala	ı Glu	gtt Val	Gly	aag Lys	cag Glr 175	ı Lei	g agg u Arg	g ccg g Pro	ttg Leu	tat Tyr 180	645
ga G1	a gaq u Glu	g tai u Tyr	t gtg · Va	g gto Val 185	Leu	jaaa Lys	a aac s Asr	gag n Glu	atq u Met 190	t Ala	a aga a Arg	a gca g Ala	a aac a Asr	aat n Asr 199	tat n Tyr	693
aa As	c gad n As	c ta p Ty	t ggg r Gly 200	y Asp	tat Tyr	t tgg r Trp	g aga o Arq	a ggg g Gly 209	y Ası	c ta <sup>.</sup> o Tyr	t gaa r Gl	a gc	a gag a Glu 210	u Gil	a gca y Ala	741
gā	ıt gg	c ta	c aa	c ta	t aad	c cg	t aa	c ca	g tt	g at	t ga	a ga	t gt	a ga	a cgt	789

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As	sp	Gly	Tyr 215	Asn	Tyr	Asn	Arg	Asn 220	Gln	Leu	He	Glu	Asp 225	Val	Giu	Arg		
ac Tł	ır	ttc Phe 230	gca Ala	gag Glu	atc Ile	aag Lys	cca Pro 235	ttg Leu	tat Tyr	gag Glu	cat His	ctt Leu 240	cat His	gcc Ala	tat Tyr	gtg Val	837	
A۱	gg rg 45	agg Arg	aag Lys	ttg Leu	atg Met	gat Asp 250	acc Thr	tac Tyr	cct Pro	tcc Ser	tac Tyr 255	atc Ile	agc Ser	ccc Pro	act Thr	gga Gly 260	885	
t	gc	ctc	cct	gcc	cat	ttg	ctt	ggt	gat	atg	tgg	ggt	aga	ttt	tgg	aca	933	}
C,	ys	Leu	Pro	Ala	His 265	Leu	Leu	Gly	Asp	Met 270	Trp	Gly	Arg	Phe	Trp 275	Thr		
a A	at sn	ctg Leu	tac Tyr	cct Pro 280	Leu	act Thr	gtt Val	ccc Pro	ttt Phe 285	Ala	cag Gln	aaa Lys	cca Pro	aac Asn 290	ata Ile	gat Asp	981	L
g V	ıtt ′al	act Thr	gat Asp 295	Ala	atg Met	atg Met	aat Asn	cag Gln 300	Gly	tgg Trp	gat Asp	gca Ala	gaa Glu 305	Arg	ata Ile	ttt Phe	1029	€
(	caa Gln	gag Glu 310	A16	a gag a Glu	aaa Lys	ttc Phe	ttt Phe 315	yal	tct Ser	gtt Val	ggc Gly	ctt Leu 320	ı Pro	cat His	atg Met	act Thr	107	7
(	Gln	Gly	/ Phe	e Trp	Ala	a aac a Asr 330	i Ser	· Met	: Lei	ı Thr	gag Glu 335	ı Pro	a gca o Ala	a gat a Asp	ggc Gly	c cgg / Arg 340	112	5
ì	aaa Lys	gtt Va	gto Va	c tgo 1 Cys	cac s His 34!	s Pro	aca Thi	a gci ^ Ala	t tgg a Trj	g gat p Asp 350	o Lei	g gga u Gly	a cad y His	gga Gly	a gad y Asj 35	c ttc o Phe 5	117	3
. '	aga Arg	a ato g Ile	c aa e Ly	g ato s Me <sup>-</sup> 36	t Cy	t aca s Thi	a aag n Ly:	g gto s Va	c ac 1 Th 36	r Me	g gad t As <sub>l</sub>	c aa p As	c tte n Ph	c ttg e Lei 37	u In	a gcc r'Ala	122	21
	caf	t ca	c ga	g at	g gg	a ca	c at	c ca	a ta	t ga	c at	g gc	a ta	t gc	c ag	g caa	126	59 .

His		G1u 375	Met	Gly	His	Ile	G1n 380	Tyr	Asp	Met	Ala	Tyr 385	Ala	Arg	Gln	
Pro	ttc Phe 390	ctg Leu	cta Leu	aga Arg	aac Asn	gga Gly 395	gcc Ala	aat Asn	gaa Glu	ggg Gly	ttc Phe 400	cat His	gaa Glu	gct Ala	gtt Val	1317
gga Gly 405	gaa Glu	atc Ile	atg Met	tca Ser	ctt Leu 410	tct Ser	gca Ala	gct Ala	acc Thr	ccc Pro 415	aag Lys	cat His	ctg Leu	aaa Lys	tcc Ser 420	1365
att Ile	ggt Gly	ctt Leu	ctg Leu	cca Pro 425	tcc Ser	gat Asp	ttt Phe	caa Gln	gaa Glu 430	gat Asp	agc Ser	gaa Glu	aca Thr	gag Glu 435	ata Ile	1413
aac	ttc	cta	ctg	aaa	cag	gca	ttg	aca	att	gtt	gga	aca	cta	ccg	ttt	1461
Asn	Phe	Leu	Leu 440	Lys	Gln	Ala	Leu	Thr 445	Ile	Val	Gly	Thr	Leu 450	Pro	Phe	
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ccc Pro	aaa Lys 470	Glu	cag Gln	tgg Trp	atg Met	aaa Lys 475	Lys	tgg Trp	tgg Trp	gag Glu	atg Met 480	. Lys	cgg Arg	gag Glu	atc Ile	1557
gtt Val 485	Gly	gtg Val	gtg Val	gag Glu	cct Pro 490	Leu	cct Pro	cgt Arg	gat Asp	gaa Glu 495	ı Thr	tac Tyr	tgt Cys	gac Asp	cct Pro 500	1605
gca Ala	tct Ser	ctg Lei	; ttc ; Phe	cat His	Val	tct Ser	aat Asr	gat NASP	tac Tyr 510	Ser	tto Phe	att Elle	cga Arg	tat Tyr 515	tac Tyr	1653
aca Thr	agg Arg	aco Thr	att Ile 520	. Tyr	caa Glr	ı tto ı Phe	caç Glr	ttt n Phe 525	e Glr	a gaa 1 Glu	agct aAla	t ctt a Leu	tgt Cys 530	Glr	gca Ala	1701
gct	: aag	g ta	t aa1	ggt	t tct	ctg	g cad	c aaa	a tg	t gad	c ato	c tca	a aat	t tco	act	1749

,	Ala	Lys	Ty:		∖sn	Gly	Ser	Leu	His 540	Lys	Cys	s A	sp	Ile	Ser 545	Asn	Sei	r T	hr		
	gaa Glu	gct Ala 550	G1	g (	cag Gln	aag Lys	ttg Leu	ctc Leu 555	aag Lys	atg Met	ct Le	g a u S	er	ctt Leu 560	gga Gly	aat Asn	tc Se	aç re	jag Glu		1797
	ccc Pro 565	tgg Trp	ac Th	c (	gaa Glu	gcc Ala	ttg Leu 570	gaa Glu	aat Asn	gtg Val	gt Va	1 6	gga Sly 575	gca Ala	agg Arg	aat Asn	at Me	: L <i>F</i>	gat Asp 580		1845
	gta Val	aaa Lys	cc Pr	:a :o	ctg Leu	ctc Leu 585	Asn	tac Tyr	ttc Phe	caa Glr	cc Pr 59	o l	ttg _eu	ttt Phe	gac Asp	tgg Trp	ct Le 59	:u	aaa Lys		1893
	gag Glu	cag Glr	gaa n As	ac sn	aga Arg 600	Asn	tct Ser	ttt Phe	gtg Val	999 Gly 609	/ I r	99 ^p /	aac Asn	act Thr	gaa Glu	tgg Trp 610	) 3	gc er	cca Pro		1941
									a gto s Va												1989
	ıyr	, A1		sp 15	GIII	1 361	7.10	= ∟y	62	) (1	9 -		00.		625	5					
	gga Gly	a gc y Al 63	a A	at .sn	gca Ala	a tai a Tyi	t ga r Gl	a tg u Tr 63	g ac p Th 5	c aa r As	c a n A	ac .sn	gaa Glu	ato Met 640	. PM	c cto e Le	g t u P	tc he	cga Arg		2037
	tc Se 64	r Se	t g r V	ıtt 'al	gca Ala	a ta a Ty	t gc r Al 65	a Me	g ag t Ar	a aa g Ly	ıg t 's T	at	tct Ser 655	, 26i	a at r Il	a at e Il	c a e L	aa ₋ys	aac Asn 660		2085
	ca G1	g ac n Th	a ç ır \	gtt /al	cc Pr	t tt o Ph 66	e Le	a ga eu Gl	ig gä u Gl	ia ga u As	sp \	gta /al 570	Arg	a gto g Va	g ag 1 Se	t ga r As	рι	ttg Leu 575	aaa Lys		2133
	cc Pr	a aq o Aı	ga ( ng '	gto Val	tc Se 68	r Ph	ic ta ne Ty	ac t <sup>t</sup> /r Pl	tc ti ne Ph	ne V	tc a al <sup>-</sup> 85	acc Thr	tc: Sei	a cc r Pr	c ca o G1	aa aa In As	sn	gtg Val	tct Ser		2181
	gā	at g	tc	at	t co	t ag	ga ag	gt g	aa g	tt g	aa	gat	gc	c at	c ag	gg a	tg	tct	cgg	3	2229

Asp	Val	I1e 695	Pro	Arg	Ser	Glu	Val 700	Glu	Asp	Ala	Ile	Arg 705	Met	Ser	Arg	
ggc Gly	cgc Arg 710	atc Ile	aat Asn	gat Asp	gtc Val	ttt Phe 715	ggc Gly	ctg Leu	aat Asn	gat Asp	aac Asn 720	agc Ser	ctg Leu	gag Glu	ttt Phe	2277
ctg Leu 725	ggg Gly	att Ile	cac His	cca Pro	aca Thr 730	ctt Leu	gag Glu	cca Pro	cct Pro	tac Tyr 735	cag Gln	cct Pro	cct Pro	gtc Val	acc Thr 740	2325
ata Ile	tgg Trp	ctg Leu	att Ile	att Ile 745	ttt Phe	ggt Gly	gtt Val	gtg Val	atg Met 750	gca Ala	ctg Leu	gta Val	gtg Val	gtt Val 755	ggc Gly	2373
atc Ile	atc Ile	atc Ile	ctg Leu 760	Пe	gtc Val	act Thr	ggg Gly	atc Ile 765	Lys	ggt Gly	cga Arg	aag Lys	aag Lys 770	aaa Lys	aat Asn	2421
gaa Glu	aca Thr	aaa Lys 775	Arg	gaa Glu	gag Glu	aac Asn	cct Pro 780	Tyr	gac Asp	tcg Ser	atg Met	gac Asp 785	ile	gga Gly	aaa Lys	2469
ggā	gaa	agc	aat	gca	gga	ttc	caa	aac	agt	gat	gat	gct	cag	act	tcc	2517
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Pro	His	Met	Thr	G1n 325	Gly	Phe	Trp	Ala	Asn 330	Ser	Met	Leu	Thr	G1u 335	Pro
Ala	Asp	Gly	Arg 340	Lys	Val	Val	Cys	His 345	Pro		Ala	•	Asp 350		Gly
His	Gly	Asp 355	Phe	Arg	Ile	Lys	Met 360	-	Thr	-		Thr 365	Met	Asp	Asn
Phe	Leu 370	Thr	Ala	His	His	G1u 375	Met					Tyr	Asp	Met	Ala
Tyr 385	Ala	Arg	Gln	Pro	Phe 390	Leu	Leu	Arg	Asn	Gly 395	Ala	Asn	Glu	Gly	Phe 400
His	Glu	Ala	Val	Gly 405	Glu	Ile	Met	Ser	Leu 410		Ala		Thr	Pro 415	Lys
His	Leu	Lys	Ser 420		Gly	Leu	Leu	Pro 425		Asp		Gln	G1u 430	Asp	Ser
Glu	Thr	G1u 435	Ile	Asn	Phe	Leu	Leu 440	Lys				Thr 445	Ile	Val	Gly
Thr	Leu 450	Pro	Phe	Thr	Tyr	Met 455			Lys		Arg 460	Trp	Met	Val	Phe
Arg 465		Glu			Lys 470	Glu	Gln				Lys	-	Trp	Glu	Met 480
				485		Val			490					495	
			500			Leu		505					510		
		515					520					525			
	530					Tyr 535					540			·	
545					550	Gly				555					560
				565		Thr			570					575	
			580		-	Pro		585		•			590		
		595				Asn	600					605	·		
	610					Asp 615					620				
625					630	Asn				635					640
Phe	Leu	Phe	Arg	Ser 645	Ser	Val	Ala	Tyr	A1 a 650	Met	Arg	Lys	Tyr	Ser 655	Ser

			660			Val		665					670		
Ser	Asp	Leu 675	Lys	Pro	Arg	Val	Ser 680	Phe	Tyr	Phe	Phe	Va1 685	Thr	Ser	Pro
	690					Ile 695					700				
/05					710	Ile				715					720
				725		Ile			730					735	
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		755				Ile	760					765			
	770		•			Lys 775					780				
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		23> F		orıme	er.										
ggcag		)0> 1 19 ca		atac	7										